

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor(s): Underbrink, et al.
Serial No.: 09/164,432
Filed: September 30, 1998
Art Unit: 2618
Examiner: Vo, Nguyen T.
Title: Using a Low Frequency Timer to Restore Timing to a High Frequency Timer

DECLARATION UNDER 37 C.F.R. § 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

I, Robert J. Terry, declare as follows:

1. I am the Assistant General Counsel/Assistant Secretary at Skyworks Solutions, Inc., which is the owner of the above-referenced patent application.

2. I declare that, as detailed in the enclosed Innovation Disclosure, the inventors of the above-referenced patent application conceived the invention of the above-referenced application, as defined by its pending claims, in the United States, on or prior to January 30, 1997.

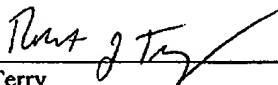
3. To evidence conception of the invention of the above-referenced application in the United States, attached hereto, please find a copy of the Innovation Disclosure submitted by the inventors of the above-referenced application, which describes the invention of the above-described patent application in Docket No. 97RSS069, entitled "Use of a low accuracy, low power oscillator for accurate time-keeping between paging channels in a mobile communications system", which was entered into the Innovation Disclosure Database, on January 30, 1997.

4. I declare that, as evidenced in the Innovation Disclosure and also by filing of the patent application in the USPTO, on September 30, 1998, the invention of the above-referenced application was reduced to practice in the United States using due diligence after conception.

5. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine of imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced patent application or any patent issuing thereon.

Date

10/13/06


Robert J. Terry
Assistant General Counsel/Assistant Secretary
Skyworks Solutions, Inc.

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Innovation Disclosure

Docket No.
Ranking 97RSS069

1. Innovator(s)

Tomlinson

Name	SSN	Dept.	Mail Code	Telephone	Supervisor
Paul Underbrink	466-21-1490	894	506-219	(714)221-3412	Tom Forgette
Michael Tomlinson	619-82-3832	892	506-108	(714)221-3325	Roberto Fregoso

2. Title of Invention

Use of a low accuracy, low power oscillator for accurate time-keeping between paging channels in a mobile communications system.

3. Problem Solved

When a mobile station is in an idle mode of operation it only needs to be active for short periods of time to receive its paging channel (e.g. in GSM this could be just 18.5ms every 2.2s) but it needs to keep time very accurately between these paging channels to ensure it receives the next one correctly. In prior art the time base used is a high frequency, high accuracy oscillator which has high power consumption. This invention allows the time base to be a low frequency, low accuracy oscillator which has relatively much lower power consumption. As mobile stations are usually battery powered it is very desirable to reduce power consumption, particularly in this idle mode.

4. Solution

When in communication with the base station a high frequency oscillator in the mobile station is tuned accurately to track the received r.f. channel. The low power, low frequency oscillator is also running at this time.

A known time period is marked by counting high frequency, high accuracy clock pulses (e.g. a frame pulse every 4.615ms is generated in GSM). Hardware is used to count the number of low frequency clock pulses in this time period is counted. As this is unlikely to be an exact integer number of the low frequency clock, a mechanism is also employed to count the partial cycles in terms of the high frequency clocks. By this method the frequency of the low frequency clock can be determined to an accuracy almost as good as the high frequency, high accuracy clock.

When the mobile station enters sleep mode the number of low

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frequency clock cycles (now calibrated to be a known frequency with high accuracy) until the wakeup point is calculated. The high frequency oscillator is turned off and just a timer running off the low frequency oscillator is kept powered. As long as the short term stability of the low frequency clock can be kept to a fairly high level (e.g. in GSM a couple of micro-seconds drift in 2.2s) the wakeup time is known to a very high accuracy. From the point where the wakeup signal is created, the high frequency clock is turned on. Once this is stable again, another timing check of the low frequency clock is made and a count from this point in terms of the high frequency clock can be made to adjust sample timing to the correct point.

By this method, only the low frequency oscillator is running in the periods between paging channels, but the sample timing for the next paging channel is still kept. This reduces power consumption of the system but does not degrade performance.

5. Status of Innovation

In design

6. Has any work on the Innovation been charged to a Government contract?

No

7. Product or program in which innovation will be used:

Specifically GSM. Any wireless projects. Any low power comms. systems

8. Has anyone disclosed or does anyone plan to disclose your innovation outside the Company?


No

9. Has anyone proposed or does anyone plan to propose a product or program to a customer which includes your innovation?

Yes

If so, when and how: GSM

10. Innovator signature(s): (Do not use black ink)

 Date 7 Feb 96
M.D. Gmbrism Date 7 Feb 97

ROCKWELL INTNL.
FEB 10 1997
N.B. PATENT DEPT.

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Modified: James K Dawson @ 01/30/97 04:06 PM

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